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# A PRELIMINARY REPORT OF THE REGIONAL SURVEY COMMITTEE

of the

BERKELEY LABORATORY

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## THE COMMITTEE

A committee was set up January 4, 1939 to study the status of the Regional Insect Survey Project of the Berkeley Laboratory. The chief function of this committee is to scrutinize the present survey set-up in all its phases and to lay the groundwork for an eventual expansion of the system. The committee has attempted an analysis of the entire project covering the administration, methods, and the use of data. Since the initial plans for the Survey were proposed in 1931, new developments and experience have shown the need for revision in many cases. The Committee has studied some of these and has presented certain recommendations below, subject to approval. Other constructive suggestions will undoubtedly be presented from time to time and should be encouraged.

The Committee has found the discussions and suggestions based upon the experience of its members decidedly helpful in planning a survey project which will meet the objectives set up for it and therefore recommends the continuation of this method of planning until the desired survey system is evolved.

## THE PRESENT SITUATION

### Administration

As set up on 1931, the Regional Survey was statewide in scope. No definite authority was listed in either of the preliminary planning reports (1, 2) though it was evident that the Survey was to receive a full project status. Whatever the intentions were at that time, the fact remains that today the Survey operates at considerable variance over the State. The Committee, after a study of the present situation, has listed a number of points where the Survey has fallen below standard or is not meeting the

objectives of the project. These include the following:

1. Supervision of the project is on a sub-regional basis, rather than state-wide, a condition more or less responsible for:

a. a variation of methods, interpretation, analysis of data, and reporting in situations where they should be uniform,

b. b. the breakdown of the project to sub-project status in each sub-region.

c. the difficulty of using the Survey results to formulate figures representing insect conditions over the state as a whole.

2. Too often of late the Survey has come to be a "fill-in" job using whatever personnel is available after the fall closing of other projects. The use of other project leaders as spotters, in particular, has often resulted in sub-standard work. The Committee is of the opinion that the interest of these men lies elsewhere, that the Survey is to them just a job which must be done, and that the crew leader is under some pressure to get the cooperation of such spotters in observance of the details of the job. It is just these details which make for uniformity between crews or areas.

3. In the past, considerable time and expense was involved in setting up some plots with the hopes that future advantages would more tham offset the cost. These advantages have never materialized, principally because of lack of maintenance work.

Due to the situation above, field methods, analyses, and representation of data seems to warrant considerable attention. The Committee feels that the field methods as used from year to year or by different crews, are not altogether uniform. Such items as tree measurement, log estimation,

tree classification, analysis of insect composition can be improved.

In analyzing data for reporting the factor of personal impressions often subordinates factual evidence gathered from the Survey. This is necessary at times due to limited sampling or known deficiencies in the quality of the sampling, but the personal element should be minimized wherever possible.

Survey reports emanating from this station are also quite varied. Lack of sufficient factual data is sometimes awkwardly covered up by lengthy opinions of the author and therefore the size and number of these reports seems all out of proportion to their value.

Coverage.

The intensively sampled areas in the state present a widely scattered and spotty picture. This has been alleviated somewhat in the past two years by additional sampling units in some areas. However, it is the feeling of the Committee that the timbered resources of the state are not now adequately sampled to base any comprehensive loss estimates. The northeastern, or eastside sub-region, seems adequate, at least as to the number and area of sampling units; the western slope of the Sierras is fairly well sampled, but needs some study on this; coverage in southern California is being greatly expanded to suit conditions there. The entire west slope of the Sierras north of the Mokelumne River and the Coast Range from Clear Lake north to the Oregon line are without either sample units or reconnaissance type of examination of any kind.

Briefly, the situation is summed up as follows.

12,500,000acres pine type in California

1,500,000 " sampled by plots

5,000,000 " sampled extensively (reconnaissance only)

6,000,000 acres without any sampling whatsoever

7,500,000 " non-pine timber not sampled

There is need not only for extension of the Survey to new areas, but also of additional or readjustment of sampling in those areas now covered.

Discussion

The above points have been selected by the Committee to show the present status of the Survey. They are presented solely in the spirit of constructive criticism realizing that there have been, ad now are, many difficulties in maintaining a large scale program such as this in the face of the constant changes in project emphasis in the Station program resulting from outside pressure, the uncertainty of Station allotments and the policy of the Station itself.

While working for an enlarged Survey program, the Committee feels that certain practices in the existing program can and should be improved and that this can be done within the present limits of the project.

## PROJECTED REGIONAL SURVEY PLAN

The plan for a Regional Survey as discussed by the Committee, does not show much change in the basic principles set forth in the 1931 plan. The need for the Survey, its objectives and uses remain the same today. The committee hopes to profit by eight years of experience since the 1931 plan was put into effect; to strengthen the weak points and incorporate new ideas and methods as they occur. With this in mind, the Committee has attempted to develop what it believes to will be a practical and efficient manner of meeting the objectives of the Survey. The plan is established here, subject to approval, of course, as it will ultimately appear with the maximum use of

of projected resources. Admittedly, it is a goal which can not be reached immediately under present resources. A discussion is given later showing how the gap between the present system and the expanded system may be bridged.

Administration

There is little doubt that much of the activity of the Berkeley Laboratory is associated with the Survey. Out of a total of 97 station reports during the two years 1937-1938, nearly one-half, or 41 reports, were based upon information obtained from the Survey. Nearly all of these were sent to cooperative agencies as part of the service policy of the Station. Yet nothing like this rationof the Station resources are devoted to this project.

While this is often due to limitations of allotments beyond the influence of the Station, there are other administrative considerations which are under the control of the Station which the Committee feels will bear modification. The present project structure within the Station acts to the detriment of the Survey. Divided supervision, differences of opinions relating to coverage and interpretation of insect conditions, differences in operation of field crews, differences in field, compilation, and reporting methods make for more or less heterogeneity in the collection and use of Survey data.

It may appear on the surface that the expenditure of past or present resources to obtain as much data as has been gathered would seem sufficient. It is believed, however, that it can be shown that the data being gathered now are inadequate to base any accurate regional estimates of insect conditions. To increase the accuracy and efficiency of the Surveyis one aim of the Committee. It therefore has the following to propose:

1. That the Survey, as soon as possible, be set up on full pro-

ject ~~leader~~ status with a full-time project leader.

2. That this centralized leadership, or authority, be uniformly extended to all phases of the Survey, to include field methods, analysis of data, and presentation of results, regardless of sub-regions or sampling methods.

3. That there be a definite statement of policy or understanding as to the place of the Survey in the annual Station program.

4. That, having established a regional program of Surveys on an annual basis, every effort be made to maintain it with regard to allotments of time, funds and personnel.

Objectives

The objectives of the Survey still remain as first outlined in 1931. The Committee would place the research phase above the service, however, because the Bureau interest in building up information in the form of long-time loss records or more specific information derived from research work is a primary consideration. The service value of the Surveys must necessarily be based upon research.

A factor of increasing importance to the Survey is the obtaining of insect conditions on cutover lands. These lands are increasing each year and the Survey should keep pace with this movement.

It is suggested that the Survey have for its immediate objective: (1) the testing of sampling methods to assure greater efficiency, more accuracy and a standardization of all phases of the work; (2) the formation of a long-time plan; (3) that such a plan be placed in service as soon as possible.

The Survey data has recently been used as evidence in forest taxation cases. This use already comes within the objectives of the project and is an example of extra uses which can result from the Survey providing there

has been a careful consideration of the objectives to begin with. The next step, of course, is to make certain these objectives can be attained.

Methods

The consensus of opinion of the Committee is that the Survey will mean more if the work, at least of obtaining annual loss records, is concentrated in the Fall months, perhaps after September first. The broods habe usually entered the overwintering stages by this time of shortly after. At this time, not only is it possible to measure a higher percentage of each current year's loss, but it is the only time that any accurate forecasting can be done. It is believed that spring and summer cruises, as part of the regular Survey have little value, except where some research phase may call for work at that time.

If the sampling methods that the Committee is proposing below are successful, there will be considerable preparatory work necessary in the field and therefore the Survey field organization could easily operate over the entire field season, though actual sample loss cruising would be confined to fall months. Here again, resource limitations and local situations may change this plan.

The Committee is not now in a position to set up definite dampling methods for a permanent Survey plan. Preliminary work on the accuracy of present sampling indicates that in some cases new methods might be found more adequate. Some work has been done on plot sampling methods which promises certain advantages over the present plot system. Until these are actually tried in the field and the results given eareful consideration, it will be difficult to lay down any detailed plans. The Committee would like to see a test of these methods this coming season as this question should be settled before any expansion of the Survey.

In brief, it seems desirable to extend the Survey to the west slope of the Sierras northof Mokelumne and to the Coast range pine belt first, then to make whatever adjustments are necessary in areas now sampled. A state-wide program of sampling will mean a broader sampling policy and possibly a breakdown of the heavy concentration of sampling units now existing in several localities.

Whatever size or shape of sampling unit is decided upon, it seems not only desirable, but necessary that the following points be considered:

1. Placing of sampling units only after careful analysis of the universe to which the sample applies.

2. Placing of sample units to take care of special research requirements or conditions of management.

3. Adequate marking of locations, boundaries and other reference points of plots.

4. Any initial work of establishing the unit to be maintained in operating condition os long as unit is in use.

5. Adequate information obtained at time of installation, including such items as:

a. stand inventory

b. accurate type and site descriptions

c. accurate area of timber types on unit

d. information on growth

e. information on management conditions

f. information on measurable physical factors.

g. any other information essential for specific problems which may be carried on.

h. measurement of past losses

i. detailed map of unit showing reference to known landmarks or road systems, type, site, culture, topography, boundary or intermediate corners or markings, direction of cruise, azimuths and magnetic declination, date of installation, and any other pertinent information.

6. A study of plot marking methods including use of stakes and posts (wood and metal), tree tags, and corner location tags for use on plot corners and as reference markers on nearby roads in place of the often-abused Forest Service location poster. A suggested form is attached.

Local conditions, as for instance, National Parks or other areas of intensive use, may require a modification of the above particularly as regards marking of trees, or lines, or other work which would create any adverse criticism or impede the normal use of that area.

The installation of new sampling units or improvements of existing ones represents an investment which should not only be maintained in good condition but used to their fullest capacity. The practice of dropping certain units in some years seriously impairs their use not only for research but for any accurate long-time infestation record, and the Committee believes that this has occurred too often in the past even when resources were adequate. The value of some of the present plots lies chiefly in their long annual loss records and these plots perhaps often bear more than their share of representation because of the lack of information on other units.

At the same time, some work should be done on methods to supplement

plot or intensive sampling units, particularly in recreational and non-commercial areas*. In other words, it seems desirable to obtain a sample over as much of the timbered area of the state as possible bases upon actual measurement of key units and to have these in sufficient distribution and number to eliminate as much as possible braad estimates based upon impressions alone. The Station may find it necessary to reconsider some of the factional information issued in the past, which has gathered in this manner, once an adequate sampling system is set up as desired.

One point which has been raised by the Committee is this problem of insect composition. Following the changes in composition, when interpreted carefully, is most important in assigning reasons for infestation behavior or forecasting infestation trends in the immediate future. This information is gathered at present chiefly through stem analysis (this term admittedly misleading and should be substituted), carried on by the Survey crews, insect field laboratories and occasionally by others. This phase is extremely desirable to the Survey, but under the projected schedules, difficult to obtain by the Survey crews. It seems, therefore, that since this information is also desirable in biological work anyway, that the function of the field laboratories might easily be extended to include this phase. A few trees analyzed in selected areas during the active brood periods by the field laboratories would furnish information of brood populations, changes of infestation, and an opportunity to study causes of current infestations not

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*Keen's use of aerial photos to show insect loss gave some promise of this method. Use of aerial reconnaissance or photographs supplimented by ground measurements may be useful to the Survey in the more inaccessible areas of the state. Improved methods used by the California Forest and Range Experiment Station in interpreting aerial photographs may be applied not only to the Survey, but to insect hazard work or similar uses. This is mentioned at this time because of the large scale aerial mapping project contemplated by the Forest service on the Tahoe N.F. in 1939. This equipment might easily be made available for any experiments the Berkeley Lab. might wish to undertake.

only during the Fall or overwintering period, but during the entire active season. The Committee feels that under present conditions this is primarily a biological problem which the field laboratories are better able to handle.

In the matter of personnel, it is believed that little difficulty should be experienced should the administrative changes suggested for the Survey project be approved. A concerted effort to raise the standard of temporary field men is showing results on the Hazard Inventory project and similar efforts should be tried in hiring Survey personnel. The employment as spotters of men long out of school, who have held responsible positions, or who must accept Civil Service ratings below their present ratings of capacities, too often prove a failure on this work. They still must be trained and checked as any new man and in addition preconceived ideas of the work or projudices quite often minimized their usefelness to the crew. The younger men fresh out of school or still in school are usually more adaptable and come with an open mind eager for new experience and recommendations which will be of help later. The salaries are also more attractive to these younger men and crew morale in general should be higher.

The Committee has discussed transportation and camp facilities and has suggested certain developments which it feels will improve the present situation. It desires a camp and transportation scheme adapted primarily for the Survey work and to certain unusual conditions heretofore unencountered. Camping eauipment has proved inadequate in some cases dur to the equipment furnished or of local restrictions. As an example, wall tents are impractical for use in National and State Park areas because of limited camping space, restrictions on cutting of poles for their support and on regulations concerning appearance of camp setups. Wood supplies in these same areas almost prohibit the use of wood cook-stoves. In the north where poles and wood are available too much time is spent in putting up wall tents or of gathering wood and as a result some Survey camps are not put up as they should

be and accordingly present an appearance which certainly does not help public relations missionary work.

It seems desirable, therefore, that the following recommendations be made concerning camp equipment:

1. Substitution of umbrella-type tents for wall tents. Two umbrella tents and a fly crew per crew seems sufficient.
2. Substitution of gasoline or other liquid fuel cook- stoves for wood cook-stoves.
3. Investigation of small portable heating units for tents - there are some new developments in this line which may prove very useful.
4. Investigation of portable tables, chairs, and supply boxes now available for tourist trade.
5. Investigation onto use of house trailers, especially adapted for office facilities, cooking, and food storage. While this may appear ambitious, it may be pointed out that they have been used by other Gevernmental agencies for work of a similar nature.

The above equipment is designed for frequent camp moves and a minimum of time in setting up and breaking camp; this last item amounting to a considerable percentage of the work time. This outfit also meets most of the requirements of recreational campground areas and should not exceed present expenditures on camp equipment.

Some consideration should be given to the use eventually of house-trailers equipped for this type of work. Interior fittings to allow for office facilities, cooking and dining, and food and equipment storage could undoubtedly be furnished. The chief advantage of this arrangement would be in decreasing time allotted to establishing of camps. With a water supply, this outfit could stop anywhere even to moving daily from plot to

plot. Some opportunity would be available for office work during inclement weather. Furthermore, much of the loose equipment now hauled around would not be necessary because of built in features.

Along this same line, transportation of field crews might be modernized with little additional effort. Just why men should be hauled hundreds of miles during a season in the back end of trucks with no seating arrangements or protection from weather and dust is a feature of the Survey which can certainly bear attention. With the automobile industry supplying new modes of travel and accomodation, it seems that now is the time to take advantage of some of these. The Survey crews are fortunate in being able to work as a unit, with little or no scattering of personnel. There are now several types of automotive equipment available for hauling men or equipment in a respectable manner. "Station wagons" and similar models seen to the Committee to have a definite place in any study of transportation of field crews. Numerous agencies, chielfy State, find them very satisfactory for transporting not only men, but equipment as well. Undoubtedly, there are certain administrative restrictions regarding this type of vehicle, but that does not make their use value any less.

Carrying capacity and dual service requirements of trucks is also essential especially since the requirements are not necessarily the same in all areas.

Analysis and Summary of Data

It is essential that the following be observed:

1. Data from all areas to be collected on a comparable basis.
2. Uniform summaries and methods of interpretation.
3. The establishment wherever possible of infestation of management units on an inventory basis so that the initial stand, loss, and residual stand, as well as growth, will be known at any time.

4. An expanded filing system for the Survey as a whole.

5. Filing of data in as convenient and useful a form as possible.

Preparation of Reports

It is obvious that the form used in reporting insect conditions in differnet localities and land use areas must differ. The Committee has considered more or less standard forms for reports in commercial, recreational, or special use areas. Some Survey reports in the past, aside from presenting a statistical analysis of insect conditions, have been outlets for lengthy opinions of the author. Once the Survey has been placed on sufficient footing, such reports will not be necessary. It would seem more desirable to place more emphasis on the statistical type of report a form more desirable to those receiving annual reports. This would allow the collection of reports over a period of years in a convenient and readily usable form.

Limitations of Immediate Expansion Program

Needless to say, the program outlined will require considerably more financial backing than is available at present. Methods in some cases, must first be tried amd even after approved the expansion of the Survey will probably be spread over a period of years. Prime factor, however, in limiting the operation of this plan is the pressure of current projects upon the demands of the Station budget and the probability of little increase in the Survey allotment this coming fiscal year. Assuming this, the Committee has tried to lay out a working plan which will make it possible to place in operation a number of suggestions presented above without much increase in resources.

Plans for 1939 Season

In view of the limitations discussed above it does not seem desirable to plan for any more than a continuation of the present Survey setup with certain modifications. Since the personnel of the Committee will be closely associated with the work of the Survey this coming season, it is possible to have an understanding as to methods and aims before the start of the field season. Work this coming seasoncan be done with the idea of making a start on a program of expansion without too much increase in present allotments for this work.

Accordingly the Committee has suggested a tentative schedule, the chief points of which at least, will meet with approval. The Survey work to be carried on as follows:

1. Plot maintenance and securing of additional information including a stand inventory (Summer months).
2. Time studies, cost statistics, and value studies on installation of 20 acres sample plots. These plots have been shown by R. C. Hall to be more efficient than the present 320 acre plots. The Committee now wishes to test the installation and other problems connected with their use in preparation for something definite to offer in the way of a Survey expansion program (Summer months to September).
3. Loss survey (September through the Fall).

The above program may seem unwarranted and out of step with present plans for allotments and personnel assignments, but in view of an eventual expansion of the Survey program it seems necessary that some of this preliminary work be done now.

This plan calls for two 4-man crews from July 1st to the end of the field season, some additional help in summarizing during the winter and the p

purchase of some equipment. A table of the cost of this schedule for the coming fiscal year is appended. Here again, the Committee feels that this expresses the maximum requirements andundoubtedly there will probably have to be a certain amount of pruning here and there to be coordinated with the remainder of the Station program. However, this represents a decrease of $1,000 over the sum charged to the Survey this past year; but in spite of this, the Committee feels that the values derived will be greater.

Regardless of the action taken on the program presented, the Committee is desirous of continuing as a body, at least, in studying the technical aspectsof the Survey.